PATENT SPECIFICATION (11) 1 350 073

1 350 073

(21) Application No. 33764/70 (22) Filed 11 July 1970
(23) Complete Specification filed 24 May 1971
(44) Complete Specification published 18 April 1974
(51) International Classification G05G 9/12
H01H 25/04
(52) Index at acceptance
F2D C035 C036 C037 C039 C043 C079
H1N 440 446 44Y 630 637 649 700 702 706 74X

(72) Inventor HAROLD RUSHTON

(19)

(54) GEAR SELECTOR

(71) We, BRITISH LEYLAND TRUCK AND BUS DIVISION LIMITED, (formerly LEYLAND MOTORS LIMITED), a British Company of Leyland, Lancashire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a gear selector and more particularly to a gear selector for electrically selecting gears.

According to the present invention a gear selector comprises a lever which has a ball and socket fulcrum and one end adapted to be moved manually and the other end in contact with a generally spherical base, a plurality of electrical contacts being located on the base so that appropriate movement of the one end of the lever will bring the other end of the lever into contact with a given electrical contact.

According to a second feature of the invention the said other end of the lever carries a spring loaded ball which either acts as an electrical contact itself or acts as a brdige between two of the said plurality of electrical contacts.

According to a third feature of the invention the lever carries a spring loaded detent which is adapted to contact a cam surface or surfaces when the lever is in a particular position or positions, in order to indicate by a rapid increase in resistance to further movement that the lever is in that position or one of the positions.

According to a fourth feature of the invention the lever carries a projection which co-operates with a sliding gate/detent member to inhibit the selection of a first particular gear directly after the selection of a second particular gear.

How the invention may be carried out will now be described, by way of example only, with reference to the drawings accompanying the Provisional Specification in which:

Figure 1 is a cross-sectional view of one embodiment of the invention;

Figure 2 is a section taken on the line A-A of Fig. 1;

Figure 3 is a plan view of the base of the selector shown in Figures 1 and 2;

Figures 4 to 6 are views similar to Figures 1 to 3 of a second embodiment of the invention; and

Figures 7 to 9 are views of a third embodiment of the invention.

Figures 1 to 3

A gear selector comprises a lever, made of plastics, which has a ball and socket fulcrum comprising a ball 2 formed on the lever 1 which engages in a socket 3 formed in a casing 4. One end of the lever 1 comprises a knob 5 which in use is manually operable and the other end of the lever carries a metal ball 6 loaded by a compression spring 7.

The ball 6 is urged by the spring 7 into contact with a track 8 which is formed on a generally spherical surface 9 on a base number 10.

The track 8 is straight, in plan, but arcuate in elevation and has on either side of it two rows of pairs of electrical contacts 11 to 14 and 15 to 18 respectively. The contacts of each pair are arcuate in shape, such as 11*a* and 11*b* for example, and are separated by gaps 19.

When the selector lever 1 is in neutral the ball 2 is in contact with the track 8, so that movement of the knob 5 in the plane of the drawing in the direction of the arrows X-X in Figure 1 causes the ball 2 to move along the track 8.

Movement of the knob 5 normal to the plane of Figure 1 will bring the ball 6 into contact with any one of a pair of electrical contacts 11 to 18, assuming that the

ball 6 is aligned with that pair. The spring 7 will cause the ball 6 to snap into position between the two arcuate contacts of a pair to bridge them and thus make an electrical circuit (not shown) in which the arcuate contacts are concerned.

Thus, any of the pairs of contacts 11 to 18 can be bridged and the associated electrical circuit made by appropriate movement of the knob 5 in the direction X-X and normal to that direction.

In order to enable a driver to sense by feel alone in which gear the selector lever 1 is positioned, an arrangement is provided by mean of which the resistance to movement of the ball 6 beyond the positions Y and Z (Figure 3) is increased.

This arrangement comprises a detent or plunger 20 which is carried by the lever 1 and loaded by a compression spring 21 to bring cam surfaces 22 on it into contact with pairs of stationary cam surfaces 23*a* to 27*a* formed on pairs of projections 23 to 27 respectively on the base 10. The cam surface 25*a* is at a greater radius, from the centre of the ball 2, than the cam surfaces 26*a* and 27*a*. The cam surfaces 26*a* deflect the detent or plunger 20 radially inwardly against the spring 21. At this point the driver will sense a rapid increase in the resistance to further movement of the gear selector lever 1 and will thus know that the lever is in either the position Y or Z

Figures 4 to 6

In the embodiment of Figures 1 to 3 the lever 1 is made entirely from electrically insulating material and the metal ball 6 forms a bridge between the two contacts of a pair 11 to 18, to complete an electrical circuit. The second embodiment (Figures 4 to 6) differs from the first embodiment in that the metal ball 6 acts as one contact and each pair of arcuate contacts 11 to 18 (Figures 1 to 3) is replaced by a single circular contact 28 to 35 respectively.

As the ball 6 now acts as one of the electrical contacts in the electrical circuit it must be electrically insulated from the control knob 5. To do this the fulcrum ball 2 is made in two portions, one portion 2*a* which is integral with the knob 5, and made of plastics and the other portion 2*b* which is metal and is keyed to the inner metal stem 36 of the lever 1. The stem 36 contacts the metal ball 6 and thus the portion 2*b* and ball 6 are electrically connected. A metal terminal plate 37 is carried by the insulated top 38 of the casing and contacts the portion 2*b* (Figure 5) so that an electrical circuit can be made through the plate 37, the stem 36, the ball 6 and the appropriate one of the circular contacts 28 to 35.

In other respects the selector of Figures 4 to 6 is the same as that of Figures 1 to 3 and therefore the same reference numerals have been used to denote like parts.

Figures 7 to 9

In some cases damage can be caused by a driver attempting to select a low gear immediately after selection of a relatively high gear, thus causing over-reving of the engine. To prevent this the arrangement shown in Figures 7 to 9 is provided.

A slidable plate 39 is mounted on the top 38 of the casing by screws 40 which pass through slots 43 in the plate to allow it to be moved between the position shown in Figure 9 and a position to the left in which spring loaded balls 41 engage in recesses 42 in the underside of the plate 39 to inhibit movement back to the position shown.

The plate 39 has a generally rectangular opening 44 to accommodate the fulcrum ball 2 of the selector lever 1. Two tongues 45 and 46 extend from the plate 39, the tongue 45 upwardly and the tongue 46 downwardly (Figure 9).

The fulcrum ball 2 has a groove 47 into which the tongue 46 is adapted to fit when the selector lever 1 is set up in a first particular position corresponding to selection of a first particular gear ratio. In this position the tongue 46 inhibits movement of the lever 1 in a direction normal to the plane of Figure 9, and thus allows the lever 1 only to be moved in the plane of Figure 9 to cause selection of a gear ratio whose electrical contact (11 to 18) is diametrically opposite the electrical contact already selected, i.e. on the opposite side of the track 8.

As the lever 1 is moved in this way a peg 48 carried by the ball 2 contacts the tongue 46 and urges it, and thus the plate 39, to the left (Figure 9) and into the aforementioned second position in which it is held by the spring loaded balls 41. In this second position the tongue 46 is clear of the groove 47 and thus it is now possible to move the lever 1 in a direction normal to the plane of Figure 9 to select a relatively low gear ratio.

WHAT WE CLAIM IS:—

1. A gear selector comprising a lever which has a ball and socket fulcrum and one end adapted to be moved manually and the other end in contact with a generally spherical base, a plurality of electrical contacts being located on the base so that appropriate movement of the one end of the lever will bring the other end of the lever into contact with a given electrical contact.

2. A gear selector as claimed in Claim 1 in which the base has a substantially arcuate track on either side of which is located the plurality of electrical contacts.

3. A gear selector as claimed in Claim 1 or 2 in which the said other end of the lever carries a spring loaded ball which either acts as an electrical contact itself or acts as a bridge between two of the said plurality of electrical contacts.

4. A gear selector as claimed in any previous claim in which the lever carries a spring loaded detent which is adapted to contact a cam surface or surfaces when the lever is in a particular position or positions, in order to indicate by a rapid increase in resistance to further movement that the lever is in that position or one of the positions.

5. A gear selector as claimed in any previous claim in which the lever carries a projection which co-operates with a sliding gate/detent member to inhibit the selection of a first particular gear directly after the selection of a second particular gear.

6. A gear selector substantially as hereinbefore described with reference to and as shown in Figs. 1 to 3 or Figs. 4 to 6 or Figs. 7 to 9 of the drawings accompanying the Provisional Specification.

A. G. H. BURRINGTON,

Chartered Patent Agent,

Agent for the Applicants.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1974.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1350073 PROVISIONAL SPECIFICATION
4 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1

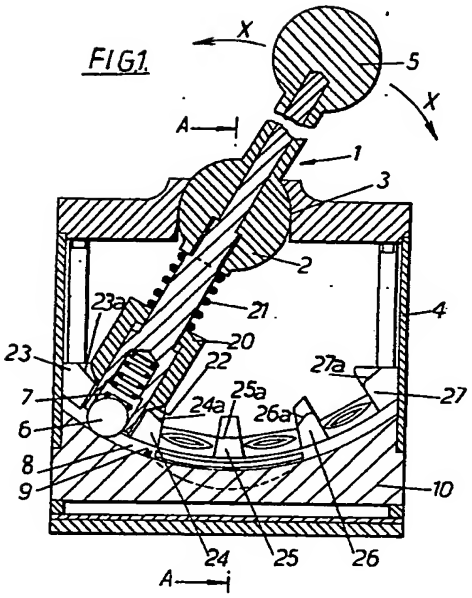


FIG.2

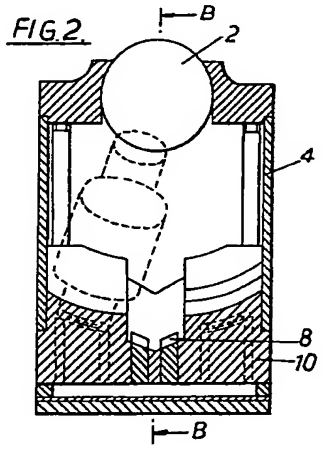


FIG.3.

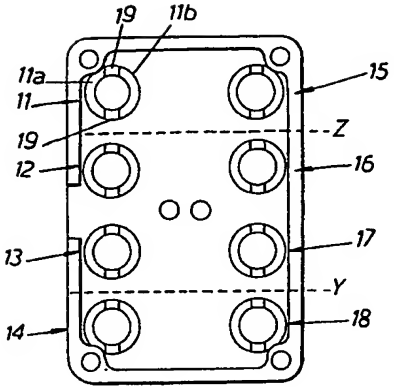

19
11b
11a
11
19
12
13
14
15
Z
16
17
Y
18

FIG.4.

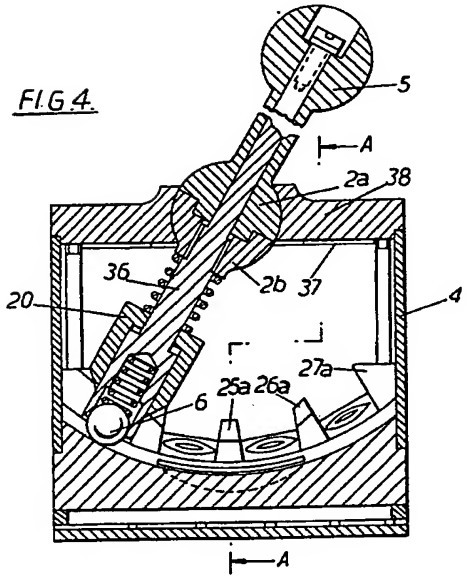

5
A
2a
38
36
2b
37
20
4
27a
25a
26a
6
A

FIG.5.

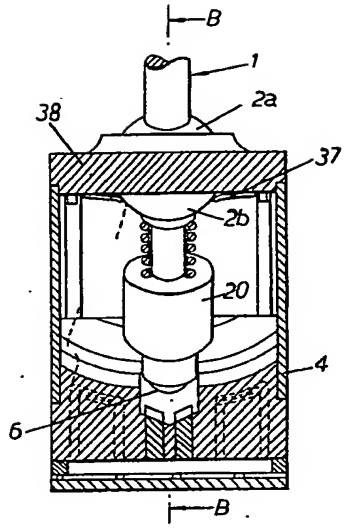
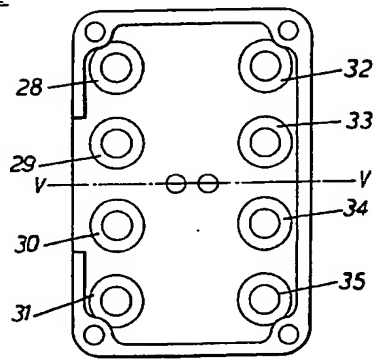


FIG.6.



1350073 PROVISIONAL SPECIFICATION
4 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 4

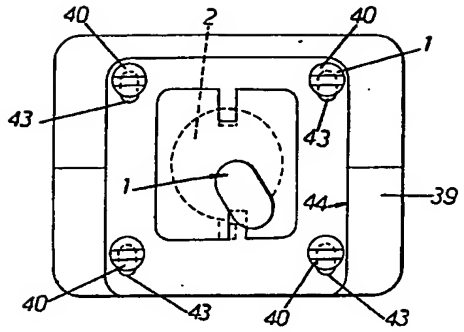


FIG.7

FIG.8.

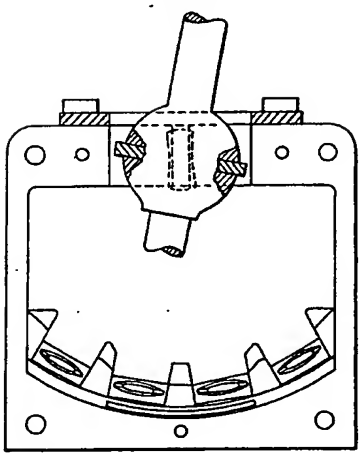


FIG.9